

frame with either a rejected or changed response code. Once a target device has accepted a notify command by the return of an interim response frame, the target device is primed to return a subsequent response frame upon the first change in the target device's state. The future change of the target device's state could be the result of an operation in progress when the notify command was received or it could be the result of a control command not yet received by the target device. A changed response code is sent if the target device supports the event notification specified by the opcode and operand[n] values and the target state differs from the target state at the time the interim response was returned. The altered target state is indicated by the opcode and operand[n] data returned in the response frame. This notification is a one-shot operation. If the controller wishes to be notified of additional changes in a target device, the controller must issue a notify command after each changed response.

As illustrated in Table I, a value of 0100 within the ctype data field indicates a general inquiry command type. General inquiry commands may be used by a controller to determine whether or not a target device supports a particular control command without being required to specify a particular set of parameters for that command. The format of the general inquiry command frame consists of only the opcode of the command which is being queried. As with the specific inquiry command, the target device shall not modify any state nor initiate any command execution in response to a general inquiry command. A target device that receives an inquiry command shall return an AV/C response frame with only one of the following two response codes: implemented or not implemented. The response frame shall also contain the opcode that was originally passed in. A response of implemented specifies that at least one of the corresponding control command variations specified by the opcode is implemented by the target device. A response of not implemented specifies that the corresponding control command specified by the opcode and operand[n] values is not implemented by the target device. Unlike other command types, general inquiry commands do not have a support level since they return information about the support level of the corresponding control command. However, the ability of an AV device to provide a response

to a general inquiry command for any opcode is mandatory. This insures that the controller shall always receive a response to a support level inquiry command.

As illustrated in Table I, the values of 0101 through 0111 are reserved for future specification and the values of 1000 through 1111 are reserved for response codes.

5 An example of a data flow diagram showing the flow of data during an immediate AV/C transaction is illustrated in Figure 4. The controlling or requesting node 80 and the target node 82 are illustrated in Figure 4. A command frame is sent from the controlling node 80 to the target node 82 and written into the target node's FCP_Command register. The transaction is complete when the target node writes the AV/C response frame into the
10 controlling node's FCP_Response register.

The AV/C command set allows 100 milliseconds for a responsive action to be sent before a transaction will time out. If the target or responding node 82 sends the response within the 100 millisecond time period, the transaction is an immediate transaction as illustrated in Figure 4. Otherwise, if the target node 82 cannot complete the response within
15 the 100 millisecond time period, an interim response is sent by the target node 82 and the transaction becomes a deferred transaction, as illustrated in Figure 5. After some time interval, when the target node 82 has completed the response, the target node 82 then sends the final response frame to the controlling node 80.

The notify command is a deferred transaction command that is used by a controlling
20 node 80 to obtain a notification of a change of state at the target node 82. For example, if a controlling node 80 wants to know when a VCR stops playing, the controlling node 80 will transmit a play notify command to the target (VCR) 82. As the target (VCR) 82 is playing, the target (VCR) 82 transmits an interim response to the controlling node 80 with the present state of the target (VCR) 82, specifying that the target (VCR) 82 is currently in the play
25 mode. When the target (VCR) 82 finally stops playing, the target (VCR) 82 transmits a final response to the controlling node 82, notifying the controlling node 82 that the state of the target (VCR) 82 has changed to stop. During the time that the target (VCR) 82 issues the

interim response and the time that the target (VCR) 82 issues the final response, the notify command is pending.

In some cases, a controlling node 80 might want to cancel a final notify response from a target node 82. For example, a controller may want to change course and perform other actions instead of waiting for a response from a notify command to return. Specifically, if a controlling node 80 wishes to perform inquiry commands on a device, it only wants to determine if a not implemented response is returned. If an interim response is returned, this typically satisfies the controlling node 80. At this point, the controlling node 80 does not care to wait for the final notify response. However, there is currently no way for a controlling node 80 to cancel a pending notify command.

SUMMARY OF THE INVENTION:

The method and apparatus for cancelling a pending notify command of the present invention includes a mechanism which allows a controlling device to cancel a pending notify command. A controlling device has the ability to cancel a pending notify command, by sending a cancelling command to a target device while the notify command is pending. Preferably, the cancelling command is a status command. Alternatively, the cancelling command is a duplicate notify command. In a still further alternative embodiment, the cancelling command is a notify cancel command. A target device which receives a notify command from a controlling device, first sends an interim response to the controlling device. When the state of the target device changes, the target device then sends a notify response to the controlling device. Before the state of the target device changes, while the notify command is pending, if the target device receives the cancelling command, the target device then cancels the pending notify command.

In one aspect of the present invention, a method of cancelling a pending notify command at a target device comprises sending a cancelling command over a network from a controlling device to the target device and cancelling the pending notify command at the target device when the cancelling command is received while the pending notify command is